UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/652,820	08/31/2000	John Oliensis	13725	4355

23389   7590   12/23/2003

SCULLY SCOTT MURPHY & PRESSER, PC
400 GARDEN CITY PLAZA
GARDEN CITY, NY 11530

EXAMINER
KIBLER, VIRGINIA M

ART UNIT	PAPER NUMBER
2623	

DATE MAILED: 12/23/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _25 August 2003_.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-15_ is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1-4,6,8,14 and 15_ is/are rejected.

7)☐ Claim(s) _1-14_ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage
application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application)
since a specific reference was included in the first sentence of the specification or in an Application Data Sheet.
37 CFR 1.78.

    a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific
reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.

4)☐ Interview Summary (PTO-413) Paper No(s). _____.

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

DETAILED ACTION

Claim Objections

1.   Claims 1-14 are objected to because of the following informalities: "windows;" should

be changed to "windows; and" in claim1, line 20; "matrices;" should be changed to "matrices;

and" in claim 2, line 2; "e) divide the successive images into windows;" should be changed to

"d) divide the successive images into windows; and" in claim 14, line 14; "f)" should be changed

to "e)" in claim 14, line 15; and "record" should be changed to "records" in claim 14, line 16.

Appropriate correction is required.

Claims 3-13 depend on claim 1, and are therefore objected to.

Claim Rejections - 35 USC § 112

2.   The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the
> subject matter which the applicant regards as his invention.

3.   Claim 11 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for

failing to particularly point out and distinctly claim the subject matter which applicant regards as

the invention.

Claim 11 recites the limitation "the vector recovered previously" in line 4. There is

insufficient antecedent basis for this limitation in the claim.

Double Patenting

4.   The nonstatutory double patenting rejection is based on a judicially created doctrine
grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or

improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington,* 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

5.   Claim 1 is provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 1 of copending Application No. 09/653,023 in view of Irani (*Multi-Frame Optical Flow Estimation Using Subspace Constraints*).

Regarding claim 1 of the instant application, claim 1 of 09/653,023 covers equivalent subject matter except for the limitations the image data being one or more characteristics selected from the group consisting of points, lines, and intensities and dividing the successive images into smoothing windows. For the image data being one or more characteristics selected from the group consisting of points, lines, and intensities, intensity is inherent in an image, thereby the image data of 09/652,820 inherently consists of intensities. Dividing the images into smoothing windows is also known in the art as evidenced by Irani (Sect. 3.2, Para. 1). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified claim 1 of 09/653,023 in view of Irani to include dividing into smoothing windows in order to simplify computations (Sect. 3.2, Para. 2).

This is a provisional obviousness-type double patenting rejection.

Claim Rejections - 35 USC § 103

6.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in
> section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are
> such that the subject matter as a whole would have been obvious at the time the invention was made to a person
> having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the
> manner in which the invention was made.

7.   Claims 1-4, 6, 8, and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Oliensis (*Structure from Linear or Planar Motion,* IEEE 1996) in view of Irani (*Multi-Frame*

Optical Flow Estimation Using Subspace Constraints).

Regarding claims 1 and 14, Oliensis discloses an image processing method for recovery

of a scene structure and camera motion (Sect. 1, para. 1) from successive image data comprising

comparing the image data of a reference image to the image data of the successive image (Sect.

2, Para. 1) wherein the successive images are taken by translating or rotating the camera with

respect to the reference image (Sect. 1, Para. 1), determining the image data shift for the

successive image with respect to the reference image (Sect. 2, Para. 1), constructing a shift data

representation that incorporates the image data shifts for each image including a first data record

corresponding to the 3D structure and a second data record corresponding to the camera motion

(Sect. 2), and determining the direction of the camera motion and the 3D structure from the shift

data representation (Sect. 2.2.1). Oliensis does not appear to recognize dividing the successive

images into windows. However, Irani teaches that it is known to divide the image into windows

and determine the direction of motion and 3D structure between the windows (Sect. 3.2, para. 1).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the

invention to have modified the recovery of scene structure and camera motion disclosed by

Oliensis to include dividing the images into windows as taught by Irani because it is well known

in the art and it simplifies the computations.

Regarding claim 2, Oliensis discloses computing projection matrices, recovering camera

rotation data records and direction of camera translation from the shift date representation and

projection matrices (Sect. 2.3.1, page 340).

Regarding claim 3, Oliensis further discloses recovering the 3D structure from the shift

data representation, the recovered camera rotation data record, and the recovered direction of

translation data record (Sect. 2.2.1).

Regarding claim 4, Oliensis discloses recovering the rotations of the camera between

each successive image, and warping all images in the sequence toward the reference image,

while neglecting the translations (Sect. 2, para. 2).

Regarding claim 6, Oliensis discloses computing a rank-1 factorization of D_{CH} with

motion and structure vectors (Sect. 2.2.1).

Regarding claim 8, Oliensis discloses setting Z_n^{-1} as constant where Z is the depth from

the camera to a 3D scene along the camera's optical axis and listing the pixels having sequential

indices (Sect. 2, para. 1; Sect. 2.3.1, para. 5). The arguments analogous to those presented above

for claim 1 are applicable to claim 8.

8.   Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Oliensis

(*Structure from Linear or Planar Motion*, IEEE 1996), Irani (*Multi-Frame Optical Flow

Estimation Using Subspace Constraints*), and further in view of Zhang et al. (6,614,429).

Regarding claim 15, the arguments analogous to those presented above for claim 1 are applicable to claim 15. Oliensis discloses an algorithm for implementing the method of claim 1, but does not specify including a processor, video source, display means, a user interaction means, and a storage device. However, Zhang et al. ("Zhang") teaches that it is known to use a processor 102, a video source whose output is digitized into a pixel map by a digitizer, where the output is sent in electronic form via a system bus 106 for access by main memory 104, a display means 146, a user interaction means for selecting items on the display means 140, 142, and a storage device 116 in communication with the processor, where the storage device stores program code for programming the processor (Figure 1) for determining structure and motion. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the method for recovering scene structure and camera motion direction disclosed by Oliensis to include expressly stating including a processor, video source, display means, a user interaction means, and a storage device as taught by Zhang because it is well known in the art.

Allowable Subject Matter

9.   Claims 5, 7, and 9-13 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

10.   Applicant's arguments with respect to claims 1-15 have been considered but are moot in

view of the new ground(s) of rejection.

Contact Information

11.   Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Virginia M Kibler whose telephone number is (703) 306-4072.

The examiner can normally be reached on Mon-Thurs 8:00 - 5:30 and every other Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Amelia Au can be reached on (703) 308-6604. The fax phone number for the

organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding

should be directed to the receptionist whose telephone number is (703) 306-0377.

VK

VK
12/12/03

MEHRDAD DASTOURI
PRIMARY EXAMINER